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## ABSTRACT

The Center for Advanced Study in the Behavioral Sciences' Program on Science, Technology, and Society (POSTS) ended in August 1976. This fourth general report summary of POSTS activities provides a listing of accomplishments of the entire five year program. Included are the names of all fellows associated with POSTS, POSTS projects completed by each fellow, the 1975-76 publications of POSTS fellows, and a listing of forthcoming publications of POSTS fellows. An appraisal of POSTS as an interdisciplinary approach is included. (SL)

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Any opinions, findings and conclusions or recommendations expressed in this publication are those of the authors and do not necessarily express the views of the National Science Foundation.

This report is the final report on the Program on Science, Technology and Society (POSTS). The earlier reports can be obtained at the Center for Advanced Study in the Behavioral Sciences, Stanford, California.

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August 31, 1976

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*Director Emeritus,*  
*Center for Advanced Study in the Behavioral Sciences*  
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Lewis M. Branscomb  
*I.B.M. Corporation*  
Sidney D. Drell  
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David A. Hamburg  
*Department of Psychiatry, Stanford University School of Medicine*  
Caryl P. Haskins  
*President Emeritus, Carnegie Institution of Washington*  
Joshua Lederberg  
*Department of Genetics, Stanford University School of Medicine*  
Robert K. Merton  
*Department of Sociology, Columbia University*

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Harriet A. Zuckerman  
*Department of Sociology, Columbia University*

### III. OFFICERS OF THE CENTER

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*Associate Director*

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*Assistant to the Director*  
Alan Henderson  
*Business Manager*

### IV. CENTER FOR ADVANCED STUDY IN THE BEHAVIORAL SCIENCES

The Center was established by the Ford Foundation in 1954. It is an independent, non-profit organization which conducts a fellowship program for distinguished scholars who are in fields that explore the question of how men and societies behave, or in disciplines sufficiently allied to the behavioral sciences that the presence of the scholar adds to the environment for all the Fellows. Each year about fifty scholars participate, working for the academic year at the Center's facility located near Stanford University.

The intent of the Center is to improve the quality of scholarship in the behavioral sciences and related fields. To accomplish this, it provides the participating scholar with the time and facilities to pursue and develop his\* intellectual interests without interruption, to reevaluate himself in relation to his field, and to interact closely with peers from various fields. Fellows are freed for the year from the teaching and administrative chores they carry at their home institutions. The Center focuses on maintaining an environment that allows for reflective study yet promotes conversation and other interaction among the scholars. In this atmosphere, scholars not only can increase their knowledge, but also can bring to their work different perspectives gained from the other Fellows. Many Fellows have found that this freshening experience continues to influence their work, and consequently that of their colleagues, years after the fellowship has ended.

Because the Center's major interest is in the scholar, not in a particular subject or field, selection of a Fellow is based on individual past performance and promise. Demonstrated or potential leadership abilities are more important than the nature of a scholar's special interests. Such interests will be to an extent reflected, however, in that each Fellow is chosen for his possible contribution to the interaction of the year's group.

Though founded by the Ford Foundation and the recipient of an endowment fund and operating grants from the Ford Foundation, the Center depends on numerous sources of funds to meet its operational expenditures. In addition to the grants made directly to the Center, some scholars arrive with outside grants or support through sabbatical leave arrangements with their home institutions.

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\*"Masculine" forms, like men, Fellow, or he, are intended, of course, to refer to both men and women.

## V. SUMMARY OF POSTS

### Program on Science, Technology and Society (POSTS)

The Center's Program on Science, Technology and Society (POSTS) was directed toward increasing understanding of our technology-dependent civilization. The aim was to illuminate the interrelation of technology and culture by promoting more effective communication among specialists in the natural, behavioral and policy sciences. The focus of the program was not so much to produce problem-solving books and articles as to make it possible for scholars involved in problems of today's society to broaden their knowledge, and to increase the awareness of socio-technical problems in scholars not now directly involved.

POSTS was begun in 1971 with support from the National Science Foundation, and the program ended in August 1976. An Advisory Council provided definition and review of the program, and nominated and helped recruit appropriate Fellows. A list of Council members is on page 2. Paul Arner became Coordinator of POSTS in March 1972, dividing his time between that function and that of being a Fellow. The Board of Trustees of the Center maintained a close interest in the program throughout its existence.

Although the National Science Foundation grant was used to initiate and sustain POSTS, financial support for the program was diverse. Since the grant did not provide for indirect costs, Center funds (either from endowment income or from other grants) were required for this aspect of support for the program. Some participating Fellows were partially supported by their home institutions and/or grants from various agencies and foundations. For example, in 1975-76, much of Gerald Holton's fellowship was provided through a direct grant from the National Science Foundation, and Gordon Meiklejohn, M.D. and Mitchell Spellman, M.D. were supported by the Henry J. Kaiser Family Foundation. Many Fellows worked on several subjects while at the Center. For some of the Fellows listed in Section VI as having been associated with POSTS, only a portion of their activities was POSTS-related. In such cases, their support from the Center was charged on a corresponding basis.

### Accomplishments

The purpose of POSTS was to improve scholarship concerning socio-scientific problems, problems which can often be approached effectively only with a multidisciplinary understanding of the subject area. Policy makers in particular have expressed a need for comprehensive information to help solve such complex puzzles as pollution, a technologically-based problem for which decision makers need data drawn from economics, law, sociology, medicine and other fields. Acquiring this multidisciplinary knowledge often requires a respite from one's usual pattern of research and publication, and so POSTS did not emphasize production of books and articles. Nevertheless, the number and quality of publications by POSTS Fellows is impressive. The 59 Fellows who participated in POSTS have to date published over 140 works stemming from their POSTS fellowships. Forty more books and articles are either in press or near the final stage of the publication process.

Of course the most important effect of POSTS cannot yet be quantified because it has to do with the germination of new research interests in the minds of POSTS Fellows. Interaction with other scholars attacking similar problems from diverse points of view broadened the outlook of POSTS Fellows, and even redirected the research efforts of some. Osler Peterson (POSTS Fellow 1974/1975) commented:

During the year I did an unusual amount of consulting for the government. It was interesting to discover that the process of thinking through many of the issues in my field gave me a much better basis for participating as a government advisor. I presume that the effect of my year can best be described as a kind of intellectual organizing process. It has served me very well, since I returned to Harvard, in selecting new research activities.

George Quester (POSTS Fellow 1974/1975) noted that POSTS broadened his "knowledge and perception of issues in economic history, anthropology, public administration, public health policy, etc." Many of these broadening and redirecting effects of POSTS will not be tangibly apparent for years to come.

Citation analysis would be a good tool for analyzing the impact of POSTS because it shows how often a book or an article is actually put to use by another scholar. Unfortunately, it is too early to conduct a useful citation analysis of POSTS' output because there is a lag of at least two to four years before authors begin widely citing another's work. Such an analysis could be done in several years to systematically evaluate the program.

Although it is too early to quantify the impact of POSTS, a quick look at a few of the numerous reviews and comments on books that have been published indicates the impact of these books on their respective fields. Due to lack of space, included here are only a few reviews of four of the nineteen books published so far. Many other reviews and comments have appeared. For example, *Race Differences in Intelligence* has so far been reviewed in over fifteen journals, not to mention many other comments and reactions to the book. A few, selected reviews follow:

***Race Differences in Intelligence*** by John Loehlin, Gardner Lindzey and J. N. Spuhler, 1975.

There has been much need for a book such as this one — a dispassionate, critical survey of the problem stated in the title — in order to offset the extreme, if not biased, positions taken by Arthur Jensen on the one hand and Leon Kamin on the other, in their recent writings on the subject. Two of the present authors are psychologists, the third an anthropologist . . . The three authors have made a diligent study of existing data and methodology and have had the assistance of a distinguished Advisory Board composed of psychologists, geneticists, and anthropologists. In addition, the draft of the manuscript was submitted to a slate of consultants at the Center for Advanced Study in the Behavioral Sciences and to numerous reviewers elsewhere . . .

—*The Quarterly Review of Biology*, March, 1976

All in all, the authors do excellently in setting forth the logic of their subject, and the yes-but-on-the-other-hand conclusions they construct from their close reading of single studies and collections of studies are invariably reasonable. Psychologists' discussions in this area will rely on this book, alongside Anastasi's, for decades.

—*Contemporary Psychology*, June, 1976

This superb volume should be the final word on origins of race and differences in intelligence.

—*Educational and Psychological Measurement*, Winter, 1975

This book is the most comprehensive, critical, and balanced review of the race-IQ issue ever to be published. Meticulously written by three cautious, qualified scholars with backgrounds in psychology and anthropology, it should help reduce the fervor that the controversy has generated in recent years and help move the central question it addresses out of politics and back to science where it belongs.

—*Science*, November, 21, 1975

*Who Shall Live?* by Victor Fuchs, 1974.

... [No book] has demonstrated a better grasp of the social context of health and health care, of the idea that central social changes, rather than mere technical tinkering with the system is at issue . . . . Everyone concerned with health care — health workers, Congressmen, and ordinary citizens and consumers — should read the central three chapters of *Who Shall Live?* . . .

—*New York Times Book Review*, March 2, 1975

... considers the incentives facing participants under alternative health-care systems. Chapters are included on the physician, the hospital, drugs and health-care financing. The book is aimed at the non-economist though important insights are provided for the seasoned professional researcher. It is timely, thoughtful, well written, and artfully brings to the non-economist the important findings from economic research that relate to the current health problems facing us. Strongly recommended . . .

—*Choice*, June, 1975

*The Great Détente Disaster* by Edward Friedland, Paul Seabury and Aaron Wildavsky, 1975.

Multiple authorship rarely succeeds; haste and passion are the enemies of thought. But this book, written in obvious haste by three dissimilar authors, and evidently strongly felt, has one very great merit that easily outweighs its faults: the oil-price crisis caused by OPEC is treated throughout as a political crisis, and not as a natural catastrophe or a dissociated economic phenomenon . . .

8 —*Commentary*, August, 1975

**Computer Power and Human Reason** by Joseph Weizenbaum, 1976

A brilliantly documented and persuasive book for scientists, politicians, and laypeople, who may be giving up to computers the responsibility for making human choices demanding ethical values and wisdom . . .

—*American Libraries*, March, 1976

An eloquent and excellent book, a deeply reflective, and felt, account of a scientist's awakening, in Weizenbaum's words, to the pernicious grandiosity that infects scientists everywhere.

—*The New Republic*, March 20, 1976

POSTS scholars frequently spoke about their work before audiences ranging from their fellow professionals to the public at large, thus increasing the general knowledge and awareness of the problems of a technology-dependent society. Over two hundred formal presentations were delivered and the number of informal lectures and discussions was many times that.

**Interdisciplinary Interaction**

Elsewhere in this report, Joshua Lederberg outlines the benefits of interdisciplinary interaction and the difficulties of forming productive heterogeneous groups of scholars. Here let us look at the various types of groups that did form within the POSTS program.

Occasionally two or more POSTS scholars would find that they had similar interests in one, well-defined topic and complementary skills for dealing with it. For example in 1974/1975, William Parson (physician) and David Mechanic (sociologist) who had not met before their fellowship year, combined their insights to produce an editorial about short-cuts that are appropriate in practical medicine. Likewise, Robert Hagerty (pediatrician), Osler Peterson (surgeon), Herman Stein (trained in social work with interests ranging over the social sciences), and Joe Wray (specialist in delivery of medical care to developing countries) are completing a paper analyzing the likely effects of national health insurance.

Several groups that had previously worked together, mainly through correspondence, came to the Center to interact more closely. One such group was comprised of Yehuda Elkana and Arnold Thackray (historians of science), Robert Merton and Harriet Zuckerman (sociologists of science) and Joshua Lederberg (geneticist). This group developed a series of related researches and activities during the year. They compiled an annotated collection of sixty volumes in the history, philosophy, and sociology of science since the 17th century. They initiated an analysis of the emerging field of science indicators: quantitative efforts to assess the current state of the scientific enterprise in the U.S. A three-day conference was held in June, 1974 to examine the problems in the field. Scholars at work in the history, politics, economics, philosophy and sociology of science, members of the National Science Board, and staff members of the National Science Foundation attended the conference. The POSTS group has edited a book, in press, entitled *Toward a Metric of Science*, which grew out of this meeting and subsequent sessions. The Conference



on Science Indicators also gave rise to the idea for an International Symposium on Quantitative Methods in the History of Science. This was convened at the University of California, Berkeley by the historian of science, Roger Hahn. Even after their fellowship had ended, members of this group of POSTS Fellows continued to meet regularly and in the summers of 1975 and 1976 collaborated on a case study of scientific discovery. Harriet Zuckerman said, "POSTS facilitated the kind of systematic collaboration with people outside my field that rarely occurs in universities . . . . What POSTS made possible was a concentration of people with shared interests but different disciplinary affiliations."

Otto Favis (political economist), Michael Dempster (mathematician) and Aaron Wildavsky (professor of public policy) were part of another established group that was able to work more closely and fruitfully at the Center. Their POSTS fellowship year was 1974/1975. Dempster said, "[POSTS] provided a unique opportunity for my collaborators on the econometric study of the U.S. Federal Budget Process and I to work together in one place with excellent supporting facilities. In addition we were provided with the opportunity to bring our methods to bear on a data base constructed by a previous POSTS Fellow . . . . The flow of work resulting from [POSTS participation] should be steady and long."

Still another type of POSTS group involved scholars who were focusing on a relatively broad topic, or a set of related topics, and who began collaborating for the first time while at the Center. The group formed in the first year of POSTS to study race differences in intelligence is an example. The book this group produced has been hailed as one of the most balanced of the many analyses of that controversial topic.

A group studying, among other things, the scope and limitations of artificial intelligence formed spontaneously at the Center in 1972/1973, beginning with discussions between Joseph Weizenbaum (computer scientist) and Israel Scheffler (philosopher). Weizenbaum and Scheffler began trying to determine just how "intelligent" machines may become and what this means to society. They soon announced their new-found common interest and invited others to join. A series of seminars and discussion groups were developed to consider the role of analogy and metaphor in understanding and explaining, the role of formal models, and the various mechanisms underlying our use of language. Weizenbaum and Terrance Sandalow (professor of law) also discussed whether computers could properly adjudicate legal problems. Weizenbaum's forceful book, *Computer Power and Human Reason*, had its beginnings in these various group discussions.

POSTS Fellows branched out into other disciplines not only through interactions with other scholars, but also through concentrated study of other subject areas. For example, Jonathan Cole (sociologist) used part of his year at the Center "retooling," studying law to provide him with the background needed for a comparative analysis of the development of legal dogma and the development of scientific "truths." Similarly, Richard Cooper (economist) spent some of his discretionary time at the Center reading history.

In sum, problems at the interface between science, technology and

society are almost always multidisciplinary and so policy making in our technology-dependent society requires broad knowledge of various fields. Yet our educational institutions, with few exceptions, produce specialists. POSTS was a program which enabled scholars from diverse specialties to interact in various sorts of multidisciplinary groups.

## **AN APPRAISAL OF POSTS AS AN INTERDISCIPLINARY EFFORT**

by

Joshua Lederberg

The bibliography appended to this summary report is the most tangible witness to the effectiveness and productivity of the POSTS program. It reflects a scope and quality that is in the best traditions of the Center, and I believe will be a source of gratification in response to any questions that might be posed about the value of the effort and of the investment that made it possible.

When POSTS was first proposed as a Center effort — a process in which I played some part together with many others — we may also have had a further range of expectations that have been met to varying degrees or in some cases rather poorly. Some of the ideological conflicts between the conception of organized group research on the one hand and the selection of individual scholars on the basis of isolated merit on the other have been compromised but never fully resolved. The Center has never understood its role to be that of a site of active, continued, focussed research on a given topic nor does it have the facilities to do this except to the most limited extent with respect to the planning or to the digestion of data already accumulated. Under the best of circumstances, the term of residence, one year, might be barely sufficient to enable a long-term interdisciplinary research project to get well started at an institution that was fully committed to its long tenure. The Center has provided an excellent opportunity for people from diverse backgrounds, geographic and academic situations, and academic interests to get to know one another and to provide useful mutual criticism. This process of mutual acquaintance and indoctrination already takes a significant part of the year.

Perhaps the greatest difficulty in the administration of POSTS, from my own perspective, was the implication that such broad-ranging interdisciplinary efforts could and should get their principal initiative from the Center as the site of solicitation. Yes, over a 10 or 15 year period of time this might indeed be workable, but we soon found that the process of negotiation with respect to a particular time and subject which is already complicated and uncertain with individual fellows becomes inordinately compounded when groups must be assembled.

I believe that we were fortunate to be able to produce a limited number of such effective groups but indeed the main thrust and value of the POSTS operation has come, as is true of most of the work of the Center today, from the efforts of particular individuals.

In my own academic work at Stanford I have been involved in several major interdisciplinary projects and believe that they can be proudly for-

warded as excellent and successful examples of such coordination: for example, the Human Biology education effort; the DENDRAL/SUMEX computer Science and artificial intelligence research project, as well as my participation in the NASA Viking exploration of Mars. It is therefore manifest that such larger scale activities can be done, can be done profitably, and may be the only way to approach certain kinds of tasks. In translating that perception to the organization of policy oriented research efforts like POSTS, I would have to reflect at this time that the local management of the Center should play only a general, overall guiding role in the organization of such programs. They will succeed primarily in terms of the initiative and effort that will come from the self-selected and self-organized groups who have discovered a particular problem, and the pertinence of their own mutual collaboration as a way of attacking it.

In accord with that model, the Center could still play an important catalytic role in furthering such initiatives, could provide the most conducive environment imaginable for such groups to work and plan together (within the constraints of facilities for operational investigative work), and in critical selections, in refinement and in managing some part or all of the requisite funding for such efforts. However, such an undertaking would have to be given an assured lifetime of a number of years before it could be expected to mature as a stable and effective institution to complement the traditional orientation of the Center's work.

Given these problems, I view it as an extraordinary accomplishment that a significant part of the total output of successful POSTS' efforts stemmed from collaborative interdisciplinary programs. The fellows' reports on their experiences should offer an excellent sample of the range of uses and successes of the program as seen through the eyes of its principal constituency.

## **VI. FELLOWS ASSOCIATED WITH POSTS\***

**1971/1972**

**Charles O. Jones**

University of Pittsburgh, Maurice Falk Professor of Politics

**Joshua Lederberg**

Stanford University School of Medicine, Professor of Genetics and Scientist in Residence at the Center for Advanced Study in the Behavioral Sciences, POSTS program (part-time)

**Gardner Lindzey**

University of Texas, Vice President and Dean of Graduate Studies

**John C. Loehlin**

University of Texas, Professor of Psychology

**Edwin Mansfield**

Wharton School, University of Pennsylvania, Professor of Economics

**James N. Spuhler**

University of New Mexico, Leslie Spier Professor of Anthropology

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\*The affiliations listed are those the Fellows had during their stay at the Center.

**Martin Krieger**

University of Minnesota, School of Public Affairs

**Joshua Lederberg**

Stanford University School of Medicine, Professor of Genetics and Scientist in Residence at the Center for Advanced Study in the Behavioral Sciences, POSTS program (part-time)

**James March**

Stanford University, School of Education, David Jacks Professor of Education

**Robert K. Merton**

Columbia University, University

**Eugen Pusic**

Zagreb University, Z Professor of Administrative Science

**Daniel Shimshoni**

Tel Aviv University, Tel Aviv, Israel, Professor of Public Administration

**Judith Tendler**

Center for Latin American Studies, University of California, Berkeley

**Arnold Thackray**

University of Pennsylvania, Professor of the History of the Sociology of Science

**Harriet Zuckerman**

Columbia University, Professor of Sociology

**1974/1975**

**Paul Armer**

Center for Advanced Study in the Behavioral Sciences, Coordinator of the POSTS program and Fellow

**Garry Brewer**

The Rand Corporation, Social Science Department, Senior Staff

**Otto Davis**

Carnegie-Mellon University, Professor of Political Economy

**Michael Dempster**

University of Oxford, Balliol College, Fellow, Tutor and University Lecturer in Industrial Mathematics

**Jacob Fine**

Harvard University, Boston City Hospital, Surgeon

**Eliot Freidson**

New York University, Professor of Sociology

**Robert Haggerty**

University of Rochester, School of Medicine, Professor and Chairman, Pediatrics

**Gudmund Hernes**

University of Bergen, Professor of Sociology

**Dale Jorgenson**

Harvard University, Professor of Economics

**Joshua Lederberg**

Stanford University School of Medicine, Professor of Genetics and Scientist in Residence at the Center for Advanced Study in the Behavioral Sciences, POSTS program (part-time)

**David Mechanic**

University of Wisconsin, Professor of Sociology

**Uwe Nerlich**

Foundation for Science and Politics, Munich, Germany, Director of Research

**William Parson**

Rockefeller Foundation, Internal Medicine, Senior Staff

**Osler Peterson**

Harvard University, School of Medicine, Professor of Preventive Medicine

**George Quester**

Cornell University, Professor of Government

**Richard Smoke**

University of California, Berkeley, Institute of Personality Assessment and Research

**Lawrence Weiler**

Stanford Arms Control and Disarmament Agency, Coordinator

**Aaron Wildavsky**

University of California, Berkeley, Dean and Professor at the Graduate School of Public Policy

**Joe Wray**

Rockefeller Foundation, Senior Staff

**1975/1976**

**Paul Armer**

Center for Advanced Study in the Behavioral Sciences, Coordinator of the POSTS program and Fellow

**Johnathan Cole**

Columbia University, Professor of Sociology

**Richard Cooper**

Yale University, Provost and Professor of Economics

**Yehoshafat Harkabi**

The Hebrew University, Israel, Professor of International Relations

**Gerald Holton**

Harvard University, Professor of Physics and History of Science

**Alvin Klevorick**

Yale University, Professor of Law and Economics

**Joshua Lederberg**

Stanford University School of Medicine, Professor of Genetics and Scientist in Residence at the Center for Advanced Study in the Behavioral Sciences, POSTS program (part-time)

**Gordon Meiklejohn**

University of Colorado Department of Medicine, Professor and Chairman

**Lincoln Moses**

Stanford University, Professor of Statistics and Dean of Graduate Studies

**Joseph Pechman**

The Brookings Institution, Director of Economic Studies

**Martin Rein**

Massachusetts Institute of Technology, Professor of Urban Studies and Planning

**Mitchell Spellman**

Charles R. Drew Postgraduate Medical School, Executive Dean

**Bernard Wolfman**

University of Pennsylvania Law School, Dean and Professor

**Robert Zajonc**

University of Michigan, Professor of Psychology

## VII. POSTS PROJECTS

The following is a review of the written materials and other products that have resulted from POSTS. Most of the material produced during the first four years of the program was described in earlier reports. However, because of the length of time between origination of an idea and completion of a paper varies considerably depending on the scholar and the subject, some of the early POSTS work is just now appearing. Synopses of this work appear in the first four sections below.

Some of the early POSTS work was completed by the scholar in time to be described in the first three reports, but was not published soon enough to be included in the "Publications" section. Those books and articles listed in Section VIII of this report but not described herein are marked with asterisks. The first three General Reports, containing descriptions of these works, are available upon request.

### 1971/1972

**Charles O. Jones**

Political scientists have tended to rely on frameworks of analysis designed to explain political behavior within traditional institutions (e.g. Congress, courts, interest groups) and this has dictated their specializations and the nature of their generalizations. However, it is useful to study the political process by examining public problems — how they get on the agenda of government, how they are acted on there, how solutions are applied and what happens as a result of these events. Jones chose air pollution as a subject to study this process because it presented the opportunity to explore the various stages of policy action for a highly technical issue affecting the affluent as well as the poor (12). Public pressure receives special attention in this study for it has a "most complex and yet potentially powerful effect on decision-making." The pattern of federal-state-local sharing of authority, the process of legitimating policy, the augmenting of policy as a result of public pressure, the complications of agency reorganization and growth are all shown to be integral aspects of the policy process.

## 1972/1973

### Israel Scheffler

Scheffler was one of the originators of a series of seminars and discussions that was the dominant thread of activity at the Center during 1972/1973 (see First General Report). During that time he wrote a book (32) on pragmatism, a system of thought that attempts to clarify and extend the methods of science. Scheffler looks closely at the work of several pragmatists, presenting not only "a sympathetic interpretation, but also a critical response."

## 1973/1974

### Martin Krieger

Since 1968 there has developed a broadly based critique of government's capacity for improving our lives. It has been argued that the government has failed to deliver promised improvements and has too much to manage, that its responsibilities would be better handled by markets, and that planning and intervention by government are undesirable. Krieger (17) notes that this critique reflects and reacts to the rhetoric of the mid-1960s, centered on equality and systematic modes of policy analysis. Krieger says, "I believe this critique is actually a mode of denying the systematic and theoretical import of a commitment to justice and equality, especially available to a rich country." Also, there is little evidence that would lead one to believe that the private sector is more efficient or that markets would work in these cases.

"What Do Planners Do?" (18) is an attempt to derive a methodology of practical action and reason based on insights from phenomenology, cultural anthropology and the structure of transcendent experience.

### Robert K. Merton

The study "... of how scientific specialties emerge, evolve and affect the development of scientific knowledge has become a focus of inquiry in the sociology of science itself." In a recent monograph (forthcoming), Merton provides a close look at the way the early workers in the sociology of science came to know one another, and how their social interaction made it possible to develop the cognitive identity of this emerging field. He shows, however, that recognition of the sociology of science as a distinct specialty was slow to develop owing to cognitive and social resistances. For one example, historians and sociologists of science use a method called "prosopography," the statistical analysis of collective biography, for which the gathering of detailed information is time-consuming and cumbersome. Thus, in the 1950's Merton and Charles C. Gillispie, a highly respected scholar, began planning "a computerized archive of biographical information ready for [prosopographical] analysis of a scale and depth never before achievable." This was to be developed in connection with the compilation of the *Dictionary of Scientific Biography*, of which Gillispie was editor. But such a quantitative orientation was judged out of place by a governing group of historians of science. Merton says, "This episode of unfulfillment represents another self-exemplifying case in the sociology of science, this being one in which commitment to the central tradition in a

particular discipline inhibits cognitive interplay with a proto-specialty emerging in another discipline." This monograph examines in fine detail various other episodes involving the interaction of cognitive and social structures in the evolution of the sociology of science.

#### Arnold Thackray

The founding of an academic society usually signals the acceptance of that discipline in the academic organizational structure. In 1975, the History of Science Society reached its fiftieth anniversary, and several of its members used the occasion to reflect on the society's past and present. Thackray looks at the events leading up to the Society's establishment, beginning in the three decades before World War I when the history of science was just becoming recognized in the U.S. as a discrete discipline, to 1924 when David Eugene Smith sent the first circulars to prospective Society members (33). Thackray concludes by noting, "Wider perspectives are needed to understand the Society's place in American culture. The history of science was successfully organized as an academic activity some three decades before it could command a critical mass of professional practitioners. Such an anomaly invites a more than antiquarian curiosity."

#### Harriet Zuckerman

Scientific discoveries are the outcome of not only cognitive advancements but also social processes. Harriet Zuckerman and several colleagues have developed a case study (forthcoming) of a scientific discovery that was delayed, or "post-mature," because the social context had not been conducive to such work until many years after the "cognitive ingredients" first became available. In 1946 Joshua Lederberg discovered that bacteria reproduce sexually. About forty years earlier, however, Martinus Beijerinck had studied bacterial variation and developed techniques making it possible to discover recombination. Why was it that neither Beijerinck or other scientists of his time actually made the discovery? First, many research opportunities are available to scientists at a given time. Because of the limitation of time and resources, scientists choose to work on those questions that look most promising, putting the others "on the back burner." Bacteria were *by definition* asexual so this research area was not even considered as problematic, much less as promising! Second, observations of bacterial recombination could easily be confused with experimental contamination. Thus, researchers proclaiming evidence of recombination could readily be and were accused of sloppiness — scientists naturally tended to avoid such risky projects. Third, studies of bacteria during the early part of the century were conducted mainly to advance medical knowledge, so there was no "home" for research on fundamental characteristics of bacteria. Zuckerman concludes, "... we suggest that problem identification and selection involves the interaction of cognitive and social elements in individual investigators' choices of what to work on..."

Political elites, and even religious elites and persons who are very wealthy, have been studied at length to determine the factors that enabled them to make their outstanding achievements. But "scientific elites have been systematically investigated hardly at all," Zuckerman says, in a forthcoming book. To fill this gap she gathered comprehensive data on



the substantive work, personal lives, and social milieux of all 92 American Nobel laureates and used these data to investigate such questions as: How does the reward system of science work? How is stratification in science created and maintained? How does the training of Nobel laureates generally differ from that of more ordinary scientists? Do outstanding scientists tend to work alone or do they tend to collaborate with colleagues? How does receiving the Nobel Prize subsequently affect the scientist and his work? Zuckerman's research reveals several distinguishing characteristics of "ultra-elite" scientists, including the fact that a Nobel laureate often receives his or her apprenticeship "under the wing" of a previous Nobel Prize recipient, thereby gaining the advantages of early access to state-of-the-art knowledge about the field and contact with the elite of that field. Zuckerman also notes that this type of advantage tends to accumulate so that "the rich" become richer at a rate that makes "the poor" progressively poorer.

#### 1974/1975

**Robert Haggerty, Osler Peterson, Herman Stein and Joe Wray** – "National Health Insurance"

During 1974-1975, Haggerty, Peterson, Stein and Wray held extensive discussions of the current health care scene in the U.S. These discussions centered on the potential effects – or lack thereof – of national health insurance on major health issues of national concern: quality, cost, access and equity. Although the discussions began informally they soon became more focussed, and the participants are now completing the final draft of a paper based on their interchanges. In this paper, they contend that a national health insurance scheme will contribute to improved access to care for some segments of the population, but will have little or no impact on other areas of concern, while it is likely to further aggravate the cost problem.

#### **Garry D. Brewer**

In a report prepared for the Ford Foundation, Brewer shows that the U.S. and other countries have developed institutions that by their very structure pose a threat to world security. For example, although the military system's rationale for ever-increasing weaponry is to ensure peace, the arms buildup causes instability and actually increases the possibility of large-scale war. Moreover, much of the military system's policy making is based on an "ideology of *win*" that precludes analysis of how to *terminate* war. Nuclear war would proceed very quickly and communications among defense commanders and political leaders could be rapidly degraded. Those military personnel left in charge would be primarily motivated by what one could call "war-conduct incentives." Thus, termination of the conflict could quickly become out of the question. Brewer calls for much deeper analysis of this problem and other areas where violence has become institutionalized. His recommendations include: (1) encouraging existing specialized bodies of professional experts to promulgate periodic reports about the world context; (2) creating a world university; (3) developing a "think tank" consulting group to provide legislators with the

technical support needed to judge the merits of complex budget requests; (4) developing international fuel recycling centers and other methods for control of nuclear reactor technologies and their proliferation; and (5) finding ways to terminate an in-progress nuclear conflict.

#### **Michael Dempster**

Dempster and Otto Davis have developed a macro-economic model which is novel in that it explicitly *includes* the government sector as an endogenous variable. Other novel features include the explicit treatment of production in a macro-economic model and a reformulation of the Keynesian money equation in terms of credit. By making additions to the Keynesian model, Davis and Dempster have been able to analyze four different modes of economic behavior of the model economy in terms of excess demand for money. One of these modes generates the simultaneous occurrence of inflation and unemployment that is the unpleasant phenomenon of "stagflation." A joint paper on the comparative static version of the model is forthcoming. Dempster is also developing a dynamic version and econometric estimations of the model based on U.S. and United Kingdom data.

#### **Gudmund Hernes**

During his POSTS fellowship, Hernes studied many aspects of collective decision making. In addition to the papers described in last year's report, Hernes has completed numerous studies of economic and political power and how decisions are made in each sphere. Three of his forthcoming papers are described below.

Economists have often used an "open-input" model to show how the economic policy of the government affects the final demand of industries, corporations, other groups, and individuals. Hernes argues that industries, corporations, other groups, and individuals in turn attempt to affect the decisions made by the government and each other. A general model for collective decisions has been developed by James S. Coleman, with actors and events as the basic units. Coleman states that actors will attempt to obtain outcomes of interactions that are beneficial to them by exchanging control of what interests them less for what interests them more. Hernes points out that the input-output model and the model of collective decisions are logically isomorphic to each other. He argues that the open-input model provides a method for analyzing the consequences of different actions for different groups. By combining it with the model for collective decisions, it is possible to quantify the impacts that decisions have for different groups, that is, the interests of the groups in those decisions. Also, using the two models it is possible to predict toward what other actors and government agencies the affected groups or individuals will direct their political efforts. In other words, Hernes develops this combined model to analyze the interface between politics and economics.

The rate of a diffusion or growth process can change through time as the result of four factors: (1) the effects of the influence may fade or intensify; (2) the population may be structurally heterogeneous or its capacities may be differentially distributed; (3) the population may change as the process goes on; and (4) the impact of exposure to the stimulus may

fade or increase over time. When *predicting* a change in the rate of diffusion or growth, it is unimportant what causes the trend as long as a model fits the data. However, when trying to *understand* a change in the rate of a concrete diffusion process, we must know what factors are at work. These are difficult to identify because one often finds that several models fit the empirical curve. Hernes argues in a forthcoming paper that such a change can be accounted for by structural heterogeneity in the target population (e.g. fashions spread more slowly in older age groups), by dynamic heterogeneity (e.g. producers being put at an increasing disadvantage as other producers adopt an invention), or by changes in the stimulus effect over time (e.g. learning, or by changing demonstration effect). To choose the diffusion model with the most explanatory power for a given process, one should first derive different empirical consequences from the models which fit the empirical curve and then confront these consequences with other sources of information.

*Many countries have sought to increase equality of educational opportunity by expanding the educational system rather than by redistributing positions within it among children from different social strata.* To evaluate the extent to which equalization has been achieved by this policy, a standard of comparison is required. Several such standards are possible, but lead to different conclusions about equalization, and are therefore implicitly value-laden. Hence it is important to choose standards which make our assumptions explicit, and which separate two effects of system expansion: net gain in access for children from all strata in contrast to equalization among strata. In measuring equalization, one should correct for a ceiling effect as the proportion of graduates from a stratum increases. In a forthcoming paper, Hernes carries out such a correction by assuming that the educational potential of children within social strata is normally distributed. By this assumption, it is found that in the five-year period, 1958-63, when the number of graduates in the Norwegian junior college system increased about 80%, there was no increase in equality of opportunity. What tendency there is in the data goes in the opposite direction, toward more inequality, and more for women than for men.

#### Dale Jorgenson

Jorgenson edited a book of *Economic Studies of U.S. Energy Policy* that was published in early 1976 (13). This book was part of a broad series of econometric analyses developed for the Data Resources' National Economic Information System (Lexington, Massachusetts). The papers in the book were based on research supported through grants from many sources, including the Ford Foundation, the Federal Energy Administration, the Department of the Treasury and Data Resources, Inc. At present there is considerable uncertainty as to what world petroleum prices will be in the future and what direction U.S. energy policy will take. The objective of this volume is "to provide a flexible basis for assessing the impact of world petroleum prices and U.S. energy policy on the energy sector of the U.S. economy and the U.S. economy as a whole." The authors have kept in mind the broad range of possible future price levels and the diversity of policies that could be implemented. Their analyses include three new econometric models of energy demand and supply that

incorporate the effects of world petroleum prices and U.S. energy policy. Jorgenson and Edward A. Hudson (Data Resources, Inc.) present an inter-industry model of the U.S. economy that relates patterns of economic growth and energy utilization to demand and supply for energy resources. They use this model to simulate the impact of alternative tax measures to induce energy conservation and to analyze the impact of various levels of international petroleum prices on energy utilization in the U.S. The most striking conclusion of their analysis is that "sufficient energy conservation can be induced by petroleum taxes to produce any desired reduction in the level of petroleum imports."

In another book (15) Klaus Conrad (University of Tübingen) and Jorgenson construct a complete accounting framework for the private economy of the Federal Republic of Germany (FRG) for the period 1950 to 1973. This system extends the present accounting system of the Federal Statistic Office of Germany in several important respects. First of all, a set of accounts is developed in both current and constant prices. The accounts that measure the economic performance consist of a production account — incorporating data on output and factor input, an income and expenditure account — giving data on factor income, expenditures, and saving, and an accumulation account — allocating saving to various types of capital formation. This accounting system provides data not only for econometric studies in producer and household behavior, but also for constructing macro-econometric growth models.

The traditional starting point for econometric studies of consumer demand is a system of demand functions giving the quantity consumed of each commodity as a function of total expenditure and the prices of all commodities. Tests of the theory of demand are formulated by requiring that the demand functions be consistent with utility maximization. Some tests of the theory of demand have required certain assumptions concerning supposedly unchanging patterns of consumption. L. R. Christensen (University of Wisconsin, Madison), Jorgenson and L. J. Lau (Stanford University) have tested the theory of demand *without* imposing these assumptions (16). They begin this task by representing the utility function in such a way that expenditure shares are allowed to vary with the level of total expenditures, and a greater than usual variety of substitution patterns among commodities is permitted. They also develop direct and indirect utility functions which make it possible to exploit the duality (somewhat like a mirror-image relationship) between prices and quantities in the theory of demand. Finally, the authors use the developed functions to test the theory of demand on consumer data for the U.S. for 1929-1972. The authors show that theories of demand with certain assumptions about consumption patterns not changing are inconsistent with the evidence. L. J. Lau and Jorgenson expand this notion in another recent paper (14).

#### David Mechanic

Mechanic continues to delve into the interactions between people who are ill, institutions founded to help them, and the personnel of those institutions. In addition to two articles for the new *Encyclopedia of Bioethics* (21 and 22), he wrote a book (19) in which he examines various aspects of the organization of medical care from the perspective of the pa-

tients, health professionals, and policy-makers. Throughout the book, Mechanic shows the subtleties and complexities of the interactions between the participants in the medical system. He emphasizes, however, that understanding these interactions is not enough — such understanding should be used as the basis for developing organizations that can provide medical services. Mechanic says, "Four basic premises are clear from the book. First, our bureaucratic organizations, ostensibly organized to serve people more efficiently, too frequently come to serve those who control them and who treat their clients in an impersonal and dehumanizing fashion. Second, under the guise of science, efficiency, and effectiveness, we often degrade the human qualities of helping institutions. Third, our society desperately needs experiments in new forms of social organization that provide renewed bases for personal commitment, that contribute to the deprofessionalization of the expert, and that encourage a higher level of caring. And, finally, medicine as a social institution is as important in its functions as a source of human sustenance and support as it is in its technical interventions. Medicine without caring is technics run wild."

In a recent paper (23), Mechanic looks more closely at one aspect of medicine. He begins by pointing out that the amount of stress one feels is not the direct result of the dimension of the challenges faced, but is rather a "transactive process between people and their life situations." A person's capacity (both inborn and learned) to deal with a particular stressful situation and the amount of social support the person receives determine to a large extent the amount of stress felt. This idea leads to a clarification Mechanic believes is needed to understand stress processes. He points out that "illness" must be differentiated from "illness behavior," which is the process of defining and responding to symptoms. He shows that stress and illness are very closely and complexly linked, with one giving rise to the other, and vice versa. Studies should be conducted that would pinpoint causes and effects in the interrelationship between illness and illness behavior.

Mechanic also looks at the social context of the "malpractice insurance crisis" (20). The old-fashioned practitioner could do little one way or the other to affect disease, but powerful medical technology makes it possible for the modern physician to greatly benefit the patient, or greatly harm him when an error is made. The apparent increase in malpractice awards is due not only to this use of sophisticated, dangerous technology, but also to the "ambiguity of medical standards," the "unwillingness of hospitals, physicians, and insurers to contest small claims, even when their merits are dubious, because of the costs of prolonged litigation," the increasing ease of conducting malpractice cases partly because of increased availability of medical testimony, growing sophistication among consumers, and a growing distrust of others in contemporary America. Mechanic says, "The malpractice crisis, in part, reflects the larger society of which it is a part, and it may be that there is only a limited amount that physicians can do to alleviate it." Mechanic suggests that considerably more research is needed to understand the outcry about malpractice insurance and that the medical profession should develop standards that could be

implemented economically yet would enable physicians who use them to feel relatively safe from malpractice claims.

#### **Uwe Nerlich**

In December 1956 the NATO Council adopted the policy of equipping theatre forces with nuclear weapons (Forward-Based Systems – FBS). In the U.S. the new policy emerged not so much from strategic analysis as from the Administration's hope of saving money and manpower. In a paper for the Hudson Institute (28), Nerlich shows that for Western Europe the decision was much more important and complex because it increased European dependence on the U.S. and because it increased differences of opinion among Alliance members, thereby making them more vulnerable to diplomatic manipulations by the Soviet Union. In the 1960's many FBS were quietly reduced or converted to conventional weapons; yet as preparations were being made for the first Strategic Arms Limitation Talk (SALT I), European interest in FBS rose sharply. "SALT provided the first opportunity for the Soviet Union to apply diplomatic leverage to NATO's nuclear posture." The Soviets did not then, or later, present a clearly defined stance on FBS. With this technique and others, they were able to reinforce differences between Alliance members.

Also, many NATO members have been uncertain of U.S. intentions during negotiations, speculating that since FBS are not as important to the U.S. as other aspects of the American defense program, the U.S. may be willing to "sacrifice" FBS in order to retain strength in other areas. The considerable secrecy surrounding SALT negotiations thus far has only exacerbated European fears and suspicions. Unfortunately, when the U.S. withdrew FBS from the SALT I agenda, those fears did not abate. Nerlich shows that the FBS controversy is an example of the Soviet Union successfully using its diplomatic skill to create divisiveness among the Allies. He says that to avoid this in the future, NATO should make a comprehensive assessment of its nuclear posture and should develop a more balanced approach to its nuclear program, incorporating both defense and negotiating objectives.

#### **George Quester**

Continuing his studies of the world military situation, Quester identifies current trends affecting the prospects of nuclear proliferation (31). For example, he says that the dramatic increase in the price of oil has, for the most part, slowed proliferation. Many countries have been forced to turn their attention to finding energy sources rather than developing nuclear military capacity. On the other hand, the tremendous new wealth of oil-producing nations will promote proliferation. Iran is pouring many of its petrodollars into a large number of nuclear plants, which will generate much more energy than the country can use, leading some observers to speculate that they are intended for military use as well. Quester goes on to weigh the likely effects on nuclear proliferation from possible continuing stagflation of the world economy, problems of "outlaw" states, reactions to the possibility of terrorist acquisition of nuclear bombs, the Indian precedent, and questions about U.S. credibility since its withdrawal from South Vietnam. He concludes by stating that we do not now know

whether proliferation can be stopped, but that it is possible to imagine the number of nuclear powers limited to ten nations by the year 2020. He says that although pessimism about proliferation can be supported, "... there may be more Canadas and Swedens in the world in the future, nations fully capable of making atomic bombs, and bound and determined not to do so."

Quester asks (30), "Who can start World War III by firing nuclear weapons, and who can veto such a firing?" The answer to this is quite complicated, partly because the possibility of nuclear war is a relatively new phenomenon. Since the Constitution was written too early to differentiate between nuclear and conventional weapons, it allows the President the same power to launch nuclear missiles as he has to deploy conventional weaponry. The President at all times controls a black box containing the codes enabling him to order nuclear attack, for defensive purposes *or* for offensive purposes. If this coded message were sent, various commanders would employ devices to determine that the message did indeed come from the President. Thus, Quester sees more danger of the President misusing nuclear power than subordinates misusing it. Quester balances his argument, however, by noting that instituting a system of delays in nuclear retaliation could undercut the deterrence effect of those weapons. He concludes by emphasizing that any tightening of controls to insure against irresponsible Executive orders regarding nuclear weapons should be done with a clear awareness of how such controls could weaken the U.S. defensive position. Nevertheless, more controls should be considered.

Quester also wrote a book (forthcoming) about how public opinion has in the past and will in the future affect the prospects of war, especially nuclear war. He argues that rather than a continuation of the nuclear "balance of terror," the "conscious tension of mutual deterrence may simply fade away as the real risks of nuclear war based on political conflict fade."

#### **Lawrence Weiler**

Weiler has been active in the field of disarmament negotiations for many years. While a Fellow at the Center, he reflected on this experience and commented upon it for the use of policy makers in the field. For example, in a recently published monograph (34), Weiler emphasizes that some of the major ills in the recent U.S. system of determining arms control and national security policy "... lie in the cloak of secrecy that has been woven over public policy during negotiations." Henry Kissinger's habit of "playing things close to the vest" has obviously not promoted candor, yet it can be demonstrated that such secrecy is unproductive. For example, the results of negotiations for the successful ABM agreement were directly influenced by the open congressional debate on ABM's, whereas negotiations concerning multiple independently-retargetable vehicles (MIRV's) were conducted behind a cloak of secrecy, resulting in failure to ban MIRV's in SALT I. Weiler recommends: "The basic proposals of the U.S. government should be available to the Congress and the public. The *texts* of such proposals should be available at least to the appropriate congressional committees and their staffs.... The issues in-



volved in policy alternatives and considerations bearing on them should be discussed with congressional committees and, to the extent mutually acceptable to those committees and the executive branch, be made part of the public record, 'sanitized' if necessary to remove sensitive technical information regarding weapons or intelligence. Key issues, including Soviet counter-proposals that develop in the course of the negotiations, should be discussed with the appropriate congressional committees . . . . Major changes in the U.S. positions during the course of negotiations should not, for any extended period, remain the secret property of the Executive after they have been tabled in the negotiations. Except as modified by the above considerations, the existing procedures regarding the privacy of the formal and informal exchanges between the two SALT delegations and higher level officials should continue." He adds, "An appropriate time to make this needed change would be immediately following whichever comes first, a final agreement on the Vladivostok accord or the beginning of the administration that will result from the 1976 elections."

#### **Aaron Wildavsky**

Wildavsky continues to publish analyses of the policy process in various public arenas, from pollution control to education. This year he published a review (37 and 38) of *The Uncertain Search for Environmental Quality* by B. A. Ackerman, S. R. Ackerman, J. W. Sawyer, Jr. and D. W. Henderson, which concerns the clean-up of the pollution of the Delaware River Basin. The book describes how politicians and environmentalists chose to spend three-quarters of a billion dollars and yet achieved only marginal (though overall) improvement when it would have been more effective to spend \$110 million on a few areas and achieve a high level of improvement in those areas. Wildavsky attempts to explain the seemingly "irrational" behavior of the politicians and environmentalists.

Achievement scores for primary and secondary school children have declined in the last decade. Also, although it has been believed for a long time that one clearly successful way to improve a child's socio-economic position is to provide him or her with educational opportunity, attempts to provide that opportunity to the poor do not seem to have helped much, either educationally or socially. In a review of two books about educational reform (39), Wildavsky says, "... though they cannot guarantee achievement, educators may still show their moral concern by spending more on the poor." In his view, federal officials and educators, frustrated in their attempts to improve students' cognitive ability, have turned to new, achievable objectives, such as equitable distribution of educational resources. Wildavsky believes that although changing one's objectives in the face of harsh reality can be necessary, one should not lose sight of fundamental purposes, e.g. teaching children, or at least not inhibiting them from learning.

#### **1975/1976**

#### **Paul Armer**

Armer is interested in the impact of technological change on indivi-



tent, if at all, has the position of women in science improved since 1900? Using cohort data drawn from five independent matched samples of 1000 men and women receiving their doctorates since 1910, he finds that women have indeed moved increasingly from marginal positions in science toward the center of the scientific community. He also analyzes how women have overcome discrimination in the past and the ways they continue to overcome social obstacles to professional advancement.

Cole reexamines these questions and others in terms of the problematics presented by "affirmative action" policy. This policy has been a subject of public controversy partly because it involves situations that are so subtle and complex it is quite difficult to identify the relevant factors. For example, it can be quite difficult to try to determine whether a woman has failed to advance in her career because of poor job performance or because of discrimination. Cole's work involves attempts to clarify the workings and effects of "affirmative action" by developing ways to define and measure elusive variables such as these.

Stephen Cole (State University of New York, Stony Brook) and J. Cole have been involved in an evaluation of the peer review system as it operates within the National Science Foundation. The peer review system has been the subject of much criticism in Congress and in the scientific community, the main charge being that it may not be meritocratic. Cole and his colleagues conducted seventy-five extended interviews with people in the National Science Foundation hierarchy and collected data on 1000 scientific proposals submitted to NSF (one-half of which had been approved, one-half denied). They will use these data to determine how the peer review system actually operates, what factors influence review discussions, and in general whether or not the system is fair.

Cole and several colleagues at Columbia University have been involved in a long-term project to design models of the development of scientific specialties and their transformation over time. The researchers are looking closely at how the social structure and the cognitive structure of a specialty influence each other.

Before coming to the Center, Cole had an avocational interest in the relationship between scientific and legal knowledge. While at the Center he was able to attend law courses and in the other ways learn to read, analyze, and research legal opinions, statutes, etc. He now plans to study the uses and abuses of social science information (such as the testimony of sociologists, economists and psychologists) in legal decisions, and to analyze the similarities between the historical growth of legal dogmas and that of scientific theories.

#### **Richard Cooper**

Much of Cooper's activity while a Fellow was devoted to questions raised by calls for a new international economic order, both by less developed countries and by the intellectual sympathizers in developed countries. He studied historical trends and new developments in world economy, and the ethical and practical principles that should be used to guide the future of the economic order.

In 1975 and early 1976 numerous high level conferences on the functioning of the world economy were held, including a session of the Interim

Committee of the International Monetary Fund (IMF) in Jamaica (January, 1976). Cooper says in an essay about this meeting (5) that it was distinguished by having "led to concrete substantive decisions." The Jamaica Agreement legitimized flexible exchange rates while encouraging participating nations to develop policies that will promote world economic stability. Cooper notes that supplementary provisions for actually managing flexible rates are needed. He assumes that governments will intervene in foreign-exchange markets and he points out that such intervention needs some control to avoid the instability that would result from one or more countries strongly undervaluing or overvaluing their currencies.

Another major action taken at Jamaica was an agreement to sell one-sixth of the IMF's substantial gold holdings on the private market and to devote the capital gains from such sales to helping the poorest countries of the world. In addition, another one-sixth of the IMF holdings is to be distributed to member countries. Cooper approves the first measure, but notes that it does not end definitely the monetary role of gold. In sum, although the Jamaica Agreement ignored some questions, it accomplished a great deal. Cooper states that it marks "... the introduction of a more coordinated approach to global economic policy."

In a forthcoming paper, Cooper comments on current problems of the world economy. He says, "Many of the rules and conventions which for many years have governed economic intercourse among nations ... are now in the process of breaking down." For example, the Bretton Woods Agreement which required, among other things, that countries fix their currency exchange rates and that they convert official holdings of currency into an asset such as gold, has been displaced by the new "floating" exchange rates and by the 1971 U.S. announcement that the dollar would no longer be freely convertible into gold. A rising number of discriminatory tariffs, changes in the pattern of East-West trade due to détente, the current uncertainties concerning rules governing access to the oceans, and rapid inflation have also been disruptive to the framework guiding world trade and financial transactions. Although Cooper remarks on the resiliency of the world economy — the economic system has continued to function despite enormous shocks, such as the four-fold increase in oil prices — he also points out that additional steps should be taken: (1) Restraint should be exercised on movements in exchange rates; (2) "... external capital should be made available to oil-consuming countries ... to make possible restraint on movements in exchange rates"; (3) efforts should be made to minimize discriminatory tariffs; and (4) "... there should be a coordinated economic expansion by all the major countries, especially by the United States, Germany and Japan."

An extraordinary increase in commodity prices occurred in 1973-74 and this was true of virtually all commodities, not just crude oil. Then, from their peaks in late 1973 and early 1974, commodity prices (oil and some foods excepted) fell dramatically. There have been many speculations as to the causes of this extreme vacillation, including the idea that it was the first indicator of long-term commodity shortages. Cooper and Robert Z. Lawrence (Brookings Institution) show (6) that the steep rise and fall in prices can largely be explained by conventional business-cycle analysis. "The leading explanation ... is that the world economy ex-

perienced an unprecedented boom in 1972-73... that period was unusual... in that economic expansion was closely in phase in... the United States, Western Europe, and Japan." Two other factors contributing to the rise in prices were: (1) a high rate of inflation in the U.S. and (2) a shift to flexible exchange rates which caused some rates to fluctuate widely, causing a demand for commodities designed to hedge against these currency uncertainties. The ordinary business cycle, inflation and the new flexibility in exchange rates account for much of the wide swing in prices, but not all. Cooper and Lawrence suggest that the large jump in prices above the predicted level was "... the result of a scramble for commodities for speculative purposes." They show that it is likely that concern over commodity shortages, currency uncertainty and inflation led users to store commodities for future production, thereby raising prices, and that this led speculators to follow suit, hoping to profit from the boom, thereby further raising prices. Such a wide swing in prices creates anxiety for consumers and has other social costs, so it should be avoided if possible. Cooper and Lawrence propose that the creation of buffer stocks (somewhat like those held by the General Services Administration) would be a better device than price controls for moderating such fluctuations.

Continuing his analysis of the international economy, Cooper looks at the subject with a focus on multinational corporations (MNC's). We have in today's world: "(1) the expectation of publics everywhere that their governments should do more for their well-being, (2) the consequential inducement of governments to turn increasingly to major corporations both as objects and as instruments of public policies to achieve those objectives, (3) the historical fact that national jurisdictions are limited geographically, confronting (4) the recent development that the domains of mobility of many large corporations have increased way beyond any particular national jurisdiction, with the implication that corporations can in some degree escape the more onerous intrusions of particular national policies simply by moving some or all of their activities elsewhere. These conditions taken together create a deep structural tension in government-business relations..." Cooper goes on to point out that this tension "... is characteristic of the times and not an occasion for blaming one party or another." He also shows that MNC's will not force us into greater planning, in the sense of detailed control, but that the high mobility of the MNC will create difficulties for certain national policies. He concludes: "[MNC's] respond to the incentives and disincentives presented by different national markets. The current need is for serious discussion of which policy-induced national incentives should be allowed to operate and which should not."

How to manage the use of the high seas is an important question, especially now that advances in technology are making the ocean's resources more accessible, and now that we are becoming aware that these resources are *not* inexhaustible. The ocean has traditionally been the property of no state, but the new developments have led some nations to try to lay claim to particular resources or geographic areas of the high seas. Many areas of ecologically related, commercially valuable fish, called "fisheries," are being depleted as international competition for fish increases. Rather than allotting particular fishing areas to certain countries, which will often

divide fisheries, Cooper proposes in a forthcoming paper that each site be "managed by a regional commission established for that fishery, with global representation but with disproportionate weight in decision-making to go to the coastal states nearest the fishery. Each commission would establish the economically optimal harvest from its fishery . . ." and would then tax fishermen at the rate that would promote just that much harvesting. Revenues from this tax would be turned over to the international community for economic development, to be dispersed through such agencies as the International Development Association. This scheme would discourage "overfishing" as well as provide funds for development of the poorer countries. Likewise, Cooper believes that corporations mining the ocean should be taxed in various ways so as to allow developing countries to partake in the profits.

Why should one group of countries transfer resources to another group? In a forthcoming paper, Cooper notes that arguments in favor of such transfers have rested partly on ethical grounds, partly on grounds of political expediency. Western industrial nations have a long tradition favoring a distributive justice that pushes toward greater equality. Cooper points out that "anthropomorphizing" nations — applying to nations ethical principles developed for individuals — is not "legitimate." One way to avoid this is to make clear the link between resource transfers and their benefit to individuals within the recipient country. This implies that transfers must be made with strings attached to ensure that the resources given will be used to improve the welfare of individual citizens; yet many developing countries object to such interference in their internal affairs.

Political expediency may call for transfers to the "middle-range" developing countries, those that are better off than the poorest countries, because middle-range countries are the most likely to be involved in the making of atomic weapons and other areas that may create difficulty for developed nations. However, making transfers solely to middle-range countries is contrary to principles of distributive justice. Since one runs into these sticky questions when trying to support income transfers on either ethical or prudential grounds, Cooper recommends that the emphasis be taken from "transfers of resources" and placed instead on increasing cooperation in the international economic order, thereby promoting *mutual* gain. For example, as we have seen in Cooper's paper on use of the oceans, both developed and developing nations could benefit from cooperation in management of the "global commons."

#### **Yehoshafat Harkabi**

In the 1950's Arab pronouncements concerning Israel dealt mainly with objectives rather than tactics, with the most important goal being "politicide" — the destruction of Israel. Arabs soon realized, Harkabi says in a forthcoming book, that a frank call for the demise of Israel elicited adverse world opinion, so the language was tempered to include such euphemistic phrases as "the liberation of Palestine." Harkabi emphasizes throughout the book that no one should be lulled by this soothing language, that many Arabs continue to hope for the destruction of Israel.

The Six-day War caused many Arabs to reevaluate and refine their attitudes toward the Israeli-Arab conflict, and gradually three "schools" of

thought were developed, all of which rely on "limited war" military tactics to make Israel unviable. The "erosion and withering away school" believes that Israel will be destroyed "not by arms but by domestic developments within Israeli society" which will arise because of the nation's artificiality. The process should be hastened by guerrilla warfare. The school advocates the reduction of Israel to its national dimension has the most support, particularly in Egypt. Its advocates believe that the political process, rather than warfare, is the best weapon against Israel. The conception of this school is open-ended; although it rejects the liquidation idea for now, it retains the option of reverting to it in the future. The "continuous struggle" school believes that the struggle against Israel should continue uninterrupted, using all kinds of violent and political means." Having few resources of its own, Israel needs friends among other nations yet Israel has often failed to rally good public opinion by playing down the Arab's intentions.

Harkabi commends in a recent article (8) that Israel exert its diplomatic efforts toward explaining the Arabs' position in depth. He also recommends conciliation and withdrawal back to the 1967 boundaries, provided the Arabs also make concessions. He admits this not because he believes the Arabs are peacefully motivated, but because he believes it to be the only way either to reveal Arab belligerence clearly or, if in fact the Arabs are actually seeking peace, to make real headway toward ending hostilities.

While at the Center Harkabi was asked to participate in the "1980's Project" of the Council on Foreign Relations in New York. This project is a survey on a grand scale of the major problems of the next decade. One of the topics is terrorism and subversion. Harkabi was asked to write a paper on "Coping with Terrorism," which will be published in one of a series of booklets on the "1980's Project." In his paper, Harkabi wrestles with the practical problems presented by highly mobile terrorists who can strike quickly at the vulnerable areas of technological societies. He emphasizes international cooperation in controlling terrorism, such as international agreements among news reporters about what is appropriate to print (and at what time) and what will only add fuel to the terrorists' strivings for notoriety.

Harkabi believes that in times of crisis, people gravitate toward contemplation of fundamentals. He himself is engaged in a long-term project to develop a basic political philosophy about the world order, rather than about the internal workings of particular states. Until recently, international relations were seen to be necessarily at least somewhat anarchical. The international system was mainly a geographical framework within which states competed. However, now we are beginning to see the world system as an entity itself exerting influence on individual nations. Harkabi is tracing the development of this change and its ramifications for the future.

#### Gerald Holton

Holton planned to work on two books while at the Center, one tentatively titled *The Scientific Imagination*, and the other a study of the scientific ethos. The former is now near completion, and both show the ex-

tent of Holton's interaction with social scientists at the Center. For example, *The Scientific Imagination* is an analysis of certain 19th-century advances in the history of physics. In this manuscript, Holton continues his exploration of the "themata" that tend to drive scientists in some directions and inhibit them from pursuing other lines of inquiry. He shows that these "themata" are drawn from the social-psychological realm, yet they affect the cognitive structure of the scientific work. Holton notes that his analysis of the role played by thematic presuppositions elicited more interest than he had expected among social scientists at the Center. This led him to recast the book so that it was more accessible to social scientists as well as to historians of science.

In 1963, in response to a steadily declining enrollment in physics classes, James Rutherford, Fletcher G. Watson and Holton began assembling a large number of people at Harvard "to design, test, and remake" the physics courses then used in U.S. schools and colleges. By the end of 1970 the three principal authors and their colleagues had completed the final, tested version of the text, anthologies, films, laboratory equipment, transparencies, test program and the rest of the course material, and the course is now flourishing throughout the U.S. and in several other countries. This success behooves us to look closely at the educational philosophy on which it is based. Holton shows (9) that previous physics courses were aimed at good students with high interest in the subject, students who would probably learn a good deal of physics regardless of instruction methods. The new course instead is directed to the average student who is only mildly interested in physics as well as to the highly motivated student with academic ability. Another innovative aspect of the program is that it describes not only the history of the discipline of physics but also the interrelation between physics and other fields. Holton says, "Whether they will become scientists or not, it is essential that students have a chance to see a full vision of science . . ."

Although at first glance scientific optimism and societal concerns both seem to come from the same psychological wellspring, further reflection reveals that the two may actually be antithetical. The young scientist may retreat to his professional world of "solvable problems" in order to avoid the confusing and "dark world of anguished compromises and makeshift improvisations that commonly characterize the human situation." Pessimism about problems outside the laboratory may cause a scientist to concentrate all his energies on work only within a narrow scientific environment, where optimism is easier to come by. Holton analyzes the test results on psychological forces that further a separation between scientific and societal concerns in two articles (10) and (11). Recently the public has become more and more doubtful as to the social benefits of science and has demanded that scientists explain themselves and their work. Relatively few are responding to this demand, however, and Holton believes that only a small fraction will respond in the future because the impulses propelling one toward work in the laboratory and toward work in society are orthogonal (or perhaps antithetical), and because the current social structure of science as a profession does not bring out the more socially aware side of scientists. The scientific ethos includes several stereotypes in which both scientists and the public be-



lieve: scientific work is expected to be objective, logical (not emotional), simple, free of errors, and it is expected to be conducted in a setting that is as removed from personal disputes as possible. There is thus a "resonance" with the original career choice of scientists, who have been shown to choose a "thing" or "ideas," as against a "people," orientation. Scientists also tend to be very conservative about any change that might be introduced into their environment, and this attitude is not supportive of work on subjects such as the ethical impact of science. In fact, career approval may be risked when scientists delve into humanistic concerns.

Holton makes several suggestions for involving more scientists in societal problems despite the psychological and institutional resistance. For example, studies on people-oriented issues could be brought to the attention of scientists at auspicious moments (e.g., during scientific congresses) and such issues could be built into the curricula of student scientists.

#### **Alvin Klevorick**

At the Center, Klevorick continued his research on public utility regulation focussing on how alternative modes of regulation affect the innovative performance of regulated firms. This led to an examination of the more general question of how to model the R&D decisions of both regulated and unregulated firms. Klevorick developed a model depicting a firm's R&D decision as a stochastic programming problem. He then set about attempting to solve that problem and investigating the characteristics of the solution.

With his colleague, Michael Rothschild (University of Wisconsin, Madison), Klevorick also looks at the process of jury deliberation and how that process relates to jury size, composition and voting rule. They focus on generalizations of a simple "birth-and-death" stochastic process model, generalizations enabling them to incorporate the phenomenon of the stubborn or resistant juror. This research is being continued and the model is being tested empirically.

#### **Joshua Lederberg**

Lederberg devoted approximately 10% of his time during the last three years as scientist in residence under the POSTS program. His principal effort was in collaboration with Merton and Zuckerman. This work, a comprehensive interdisciplinary case study of the history of the origin of microbial genetics, will be articulated in a forthcoming book and several articles.

In addition, Lederberg has served as a member of the Advisory Group for POSTS, and as an informal consultant from his platform of expertise in natural science to a number of fellows. He has also prepared testimony on the problems of administration of Peer Review within the National Institutes of Health, and on some of the benefit-cost considerations connected with research on "recombinant DNA." He has also consulted with the World Health Organization on the management of research within WHO and participated in the planning of comprehensive programs in ~~translational~~ health now being mounted by the WHO.

### Gordon Meiklejohn

Meiklejohn's major undertaking last year was a project in collaboration with Mitchell Spearman to study the problems of tenure in U.S. medical schools. This project is described more fully under "Mitchell Spellman." Meiklejohn also supervised the research on "swine influenza" vaccine conducted at the University of Colorado medical laboratory and coordinated it with the national effort on this problem. He was instrumental in evaluating the effectiveness and reactogenicity of vaccine against the disease, and devising ways to deliver it efficiently.

While at the Center, Meiklejohn continued his role as consultant to the smallpox eradication program of the World Health Organization (WHO). This program is now in its final stages, and Meiklejohn has written (25) about one area in which the program was met with stubborn resistance. WHO began its smallpox eradication program in 1967 with the avowed goal of wiping out smallpox by 1977. At that time there were 30 countries in which smallpox was endemic, but by 1972 WHO and other organizations had eliminated the disease from most of them. One of the exceptions was India, a country in which the disease was still rampant. Many Indian officials responsible for identification of smallpox were ashamed to report outbreaks of the disease within their jurisdictions and so many cases were covered up, thereby blocking the use of containment procedures which are the most effective means for eliminating the illness. Gradually health officials of the Indian government and other health personnel were able to change this attitude toward reporting, partly by offering cash incentives for early identification of the disease. Finally, by mid-1975, through dedicated, long-term effort, WHO and other organizations were able to eradicate smallpox in India. This remarkably successful endeavor could well be used as a model for attacking other world health problems.

### Lincoln Moses

Moses was involved in several applications of statistical techniques, and a review of *The Handbook of Evaluation Research*. He is in the planning stage of a study of the association, if any, between deaths and atmospheric sulfate levels in 1973. He is also developing an approach to assessing the adequacy of the fineness of a network of air pollution monitoring stations. This work has resulted in a preliminary paper.

Although aptitude tests are not supposed to be influenced by short term change through learning, perhaps they are. The Graduate Record Examination (GRE) Board research program conducted an experiment to study this issue. In this study, 446 students were divided into two groups - the control group received the GRE exam twice in succession, then received instruction on how to reduce anxiety during test-taking, and then took the GRE test for the third time. The experimental group received the GRE test once, then anxiety-reduction instruction, a second GRE test, substantive instruction, and a third GRE test. Unfortunately, 113 students dropped out after taking the first GRE test, thereby leaving the study data quite fragmentary. Nevertheless, Moses and Suzanne Wong (Stanford University) were able to obtain some significant results (26).



They found that instruction does indeed improve the students' scores, and that it is *not* the substantive coaching but rather the anxiety-reduction instruction that is influential.

The analyses of the badly fragmented and unbalanced data proceeded largely by judicious application of t-test methods to averages of the experimental and control classes. An objection to this could be made because the classes furnished varying numbers of subjects. Moses and Wong argue, however, that the procedure is reliable for several reasons, including: (1) if the study were to be generalized, its conclusions would be applied to *classes* (which would also vary in size); and (2) as the between-class variability grows large compared with the within-class variability, the differences in sample size matter less.

In another study, Moses collaborated with Lee Cronbach, Lee Ross and others in a review of *The Handbook of Evaluation Research*. The *Handbook*, edited by Marcia Guttentag and Elmer Struening, is a collection of essays on various aspects of the evaluation of social intervention programs. The *Handbook* was published in response to a long-standing need for a single source of systematic, comprehensive, and definitive papers on this emerging field. The review praises the objective of the *Handbook*, but points out several weaknesses. One of the most important flaws is that the *Handbook* does not confront controversies (which "abound") in the evaluation field. The reviewers state, "... it is apparent that the *Handbook* contributors disagree in their experiences, outlooks and recommendations. Nevertheless, the authors obviously have not been invited to explore the conflicts." Also, the *Handbook* does not sufficiently emphasize the dangers and difficulties of the conflict between the political uses of the results of evaluation research and the need for "objectivity" in obtaining those results. Finally, the reviewers observe, "Perhaps the most serious weakness of the *Handbook* is its failure to make clear how evaluation research is distinct from field research in general." Social scientists other than evaluators are able to exercise much more control over their research. Evaluators are often called in when a program is already under way, and are often asked to study programs that operate for relatively short time periods with large numbers of subjects. These factors and others present obstacles to sound evaluation which do not arise to such an extent in other social science research.

The reviewers conclude this paper with an alternative approach to evaluation that would remove some of these obstacles. They believe that an evaluator should be involved in the formation of a program, should formulate questions as the program progresses, and should have a hand in improving the program while it is in operation. "Evaluation thus becomes a component of the evolving program itself, rather than a disinterested monitoring undertaken to provide ammunition to the warring factions in a political struggle."

#### Joseph Pechman

Pechman's book, *Federal Tax Policy*, is used by scholars and policy makers as an authoritative source of information on federal taxation. Last year he rewrote much of this book for its third edition. He also edited a

(forthcoming) book on federal taxation, and wrote two papers, one on inflation adjustment for income tax and one on recent developments in the Japanese economy.

Inflation causes significant increases in the effective rates of the individual income tax for several reasons, including the fact that as inflation increases a family's absolute income, the family is thrown into a higher tax bracket. This is true even when the family's real income remains the same as before. To counterbalance this effect of inflation, indexing the individual income tax has been suggested by several analysts. (It is not feasible, or necessary, to index the whole Code, but only the most important items in the Code, such as personal exemptions and rate bracket boundaries.) The authors show that a family of four with an \$8,000 income paid taxes of \$347 in 1975; if inflation were 10%, by 1976 that family would be taxed \$483. However, if taxes were indexed the family would pay only \$382, a 10% increase from 1975, which would keep the family's real after-tax income apace with inflation.

Although Congress has not indexed the Internal Revenue Code, it has periodically reduced taxes. Surprisingly enough, these cuts have more than offset the impact of inflation — indexing, rather than the periodic cuts, would have resulted in a higher average effective tax rate. The authors show that without further cuts and without indexing, tax revenues will increase each year at a rate of \$2.4 billion per point of inflation until the effect of inflation on tax revenues will tend to accumulate and therefore rise even more sharply. By 1981 the increased revenue will be \$34.4 billion and the effective rate of individual income tax will average 20.6%. It should be noted that because the rate of tax progression is steepest in the \$25,000 to \$100,000 range, the families in that range will be hit hardest by this effect of inflation.

The typical cycle of the Japanese economy has been for Japanese firms to turn attention to export markets when domestic sales declined; production would then increase, enabling the Bank of Japan to ease monetary policy, which in turn would promote business investment expenditures, thereby rekindling the economy. In a forthcoming paper, Lawrence Krause (Brookings Institution) and Pechman state: "The present cyclical experience differs in many respects and reflects in part structural changes that have occurred in the Japanese and world economy." In general, the Japanese recession, which began in 1973 and is now ending, was much deeper and more difficult to handle than previous slowdowns. The oil crisis intensified the recession and floating exchange rates made it difficult to stimulate the economy through exports (exports can still help any country to sustain recovery, but persistent surpluses now affect the value of the currency). The Japanese government concentrated on controlling the high inflationary trend that began even before the slowdown, and this was done very well, partly through tight monetary policies and partly through high corporate taxes. Krause and Pechman point out one structural change in the Japanese economy that they believe should trigger a policy change by the Japanese government. Private incomes in Japan have risen considerably and have wrought changes in consumer demand more toward services and away from goods which implies less need for expansion of manufacturing capacity than in the past and more desire for public

goods relative to private goods. The authors believe that the Japanese government should thus begin expanding the government's share of the resources in the Japanese economy, and should take other measures that might raise inflation somewhat but would also surely strengthen Japan's recovery.

#### **Martin Rein**

Rein is deeply interested in the uses of policy research and the extent to which policy research goes unused. In a book to be published in November, Rein explores the current and possible interactions between the social sciences and public policy. The essays in this book attempt, from different perspectives, "to examine what is and what ought to be the relationship between, on the one hand, empirical research and social science theory and, on the other, the development, implementation and assessment of public policies." Rein rejects what he calls "decisionist" assumptions of policy analysis. Such assumptions are the basis for the view that values must be accepted arbitrarily whereas "factual" premises are grounded in reality. He argues instead that both values and "facts" must be evaluated. His essays are an attempt to develop an approach to the analysis of policy issues that is based on value criticism and informed by the unresolved questions posed by the sociology of knowledge. For example, he believes the crucial task of policy review "to be the analysis of goals in their own terms, in relation to: (a) the intrinsic meaning of collective values when translated into social purposes; (b) the relationship to other goals with which they may be in conflict; (c) the questions of priorities which arise from the pursuit of goals which have equal attractiveness . . . ; and (d) economic and political constraints which must either be accepted or re-defined."

#### **Mitchell Spellman**

While at the Center, Spellman and Gordon Meiklejohn collected and began analyzing data on faculty tenure in American medical schools. Medical school faculties have grown at a phenomenal rate during the past fifteen years, and the prospect of guaranteeing continuing financial tenure to all associate professors and professors has become a matter of increasing concern to most administrators and governing boards. With the likelihood of a shrinkage or leveling off in funding from federal, state and private sources, the situation has become more acute.

Spellman and Meiklejohn found that, while the literature on tenure in American universities and colleges is voluminous, remarkably little is available on tenure in medical schools. Even the Association of American Medical Colleges, which has extensive data on medical school faculties, has little material on tenure policies or practices. Therefore, Spellman and Meiklejohn sent questionnaires to deans and faculty representatives in order to gather factual information on the current situation, opinions on what are considered to be the good and bad features of tenure, and, finally, views on whether tenure should be retained in its present form, retained with modifications, or abolished. The response to the questionnaire was good, with replies received from 112 of 117 deans, and from faculty representatives of about half the schools contacted. Interviews with ten

representative deans in various parts of the country are in progress. The study has already provided considerable previously unrecorded data. This is now being analyzed and will be used as the basis for at least one publication.

### **Bernard Wolfman**

The major project Wolfman undertook last year involved a study of the federal income tax on corporations and their investors. He says, "Uneven in its application, extraordinarily complex, unfair in that it fails to treat alike people and transactions that are substantially alike (this, largely because of procedural, not substantive, provisions favoring some and hampering others), the corporation income tax and related provisions of the individual income tax have required fundamental, objective analysis and overhaul." Wolfman is in the midst of such an extensive analysis, which he will publish soon with recommendations for change. A talk touching on this and related subjects will be published in the *Stanford Magazine*.

Wolfman has noted that improving the fairness of corporate income taxes is complicated by many things, including the fact that no one knows who really pays corporate income taxes. Do they come from the capital sector, the consumer (as part of the cost of goods and services), or the working force (in the form of lower wage rates)? Because we do not know who really pays corporate taxes, it is difficult to reform these complicated tax laws. Several proposals have been made, including deferral of taxation until corporate income has been distributed. In addition to his own comprehensive study of the corporate tax system, Wolfman has been a consultant to the American Law Institute's Income Tax Project, working on methods to improve efficiency and equity in the application of present corporate tax laws.

In January 1976, Wolfman spoke on "Emerging Issues of Federal Tax Policy" (40) to Town Hall of California and to the Chancery Club of Los Angeles. This talk was about tax laws affecting individuals as well as corporations. It was taped and broadcast over forty radio stations throughout the United States. In this presentation, Wolfman remarks that the federal tax system is very effective, raising about \$240 billion a year, yet in the last several years there has been a growing awareness of the system's flaws. Academicians, politicians and others are concerned about such questions as how federal taxation affects fiscal policy and whether the tax system is equitable. In 1975 the House Ways and Means Committee developed a series of particularized proposals for reform of the tax system, but very little was enacted. Wolfman points out that the delay in acting on these measures may be beneficial because it will allow time "to investigate the fundamental problems of tax policy without the immediacy of particular provisions."

Major issues requiring analysis in order to understand the distortions in the impact of the tax system relate to so-called "tax shelters," capital gains preferences, and itemized personal deductions. Until 1974, when Congress enacted legislation to calculate the taxes "lost" because of these and other preferences, no one had quantified their significance. In 1976 preferences will cost about \$103 billion. Wolfman points out that it is

reasonable to think of that \$103 billion as a *subsidy* to the corporations and individuals who did not pay taxes on some part of their income. When determining economic policy, the federal government and private sector should consider the impact of these "subsidies" or "tax expenditures" as they are now called.

### **Robert Zajonc**

Last year Zajonc concentrated on one large area of social psychology, the effects of intellectual environment on intelligence. He wrote much of a book on that subject while at the Center, and published an article about it in *Science* (41).

In 1962 the average Scholastic Aptitude Test (SAT) score of high school seniors was 490, whereas in 1975 it was 450. A number of diverse conditions probably converged to precipitate this decline. Zajonc focuses on one set of such factors, those associated with changing family patterns. He begins by summarizing a theory, called the "confluence model," that specifies the conditions under which family configuration may "foster or impede intellectual growth." This model basically postulates that the intellectual growth of the child is generally fostered the smaller the family, the closer the child is to being firstborn, and the larger the age gap between the child and his siblings. Zajonc says, "...even though the confluence model ignores much of the richness of the social processes that mediate intellectual growth, it leads to a variety of empirically supported inferences about differences in intellectual test performance among individuals and groups." Zajonc tested his model against several large sets of data on achievement exam scores of children from various countries. He found, among other things, that if the birth rate of a region is rising (a condition almost always accompanied by decreased size in sibling spacing) test scores tend to decrease in comparison to those of students in regions of falling birth rates. He also found that correlations between family configuration and test scores cut across socioeconomic levels, and in fact explain at least some of the difference between the scores of higher and lower socioeconomic groups in that the poor tend to have more children more closely spaced. In sum, the lower SAT scores of 1975 can be correlated with a rising birth rate at the same time the 1975 seniors were born, and its concomitant large family size and small sibling spacing.

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MERTON, ROBERT K. "The Sociology of Science: An Episodic Memoir," in *The Sociology of Science in Europe* (R. K. Merton and Jerry Gaston, editors). Carbondale, Illinois: University of Southern Illinois Press, 1976.

MOSES, LINCOLN. "Some Thoughts About Assessing Adequacy of the Fineness of a Grid of Monitoring Stations."

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PUSIĆ, EUGEN. *Order and Randomness in Human Cooperation Systems*. Pittsburgh, Pennsylvania: International Studies Association, 1977.

QUESTER, GEORGE. *Public Opinion and War*.

QUESTER, GEORGE. "The World's Tolerance for Terrorism," in a book to be published by the Hebrew University for International Affairs.

REIN, MARTIN. *Social Science and Public Policy*. Harmondsworth, England: Penguin Education, 1976.

REIN, MARTIN and Sheldon White. "Problem Setting in Policy Research."

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SMOKE, RICHARD. *Controlling Escalation*. Cambridge: Harvard University Press, 1977.

WOLFMAN, BERNARD. "The Federal Income Tax System." *The Stanford Magazine*, Fall, 1976.

ZUCKERMAN, HARRIET. *Scientific Elite: Nobel Laureates in the United States*. New York: Free Press, 1977.

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## IX. PRESENTATIONS – 1975-1976\*

### Paul Armer

"Administration and Organizational Problems Associated with Programs on "Technology and Society," at the University of Denver.

"Computers and Society," at the California Education Computing Consortium, San Diego, California.

"EFTS and the Consumer," at a Workshop on Software Editing sponsored by the National Science Foundation, San Francisco, California.

"EFTS, the Computer and Society," Testimony before the Presidential Commission on EFTS, Washington, D.C.

"Information Policy Needs of the United States" (briefing of Vice President Rockefeller) in Washington, D.C.

"Implications of Information Processing Technology," at the U.S. Naval Postgraduate School, Monterey, California.

"Legal Issues of EFTS," at the New York University Law School.

"Obsolescence and the Need for Self-Assessment Testing," National Computer Conference, New York, New York.

"Obsolescence of Knowledge: Research Problems for Psychology," at the Western Psychological Association Conference, Los Angeles, California.

"Social Implications of EFTS," at the Joint Financial Management Improvement Program Conference, Washington, D.C.

"Technological Obsolescence," at the Data Processing Managers Association Conference, San Francisco, California.

Seven lectures on "Obsolescence of Knowledge," "Developments in Information Processing in the United States" and "Computers and Society," to various chapters of the IBM Computer Users Group, Japan.

### Jonathan Cole

Conference on Science and Public Policy, sponsored by AAAS at the Center for Advanced Study in the Behavioral Sciences.

"The Hierarchy of the Sciences: Myth or Reality?" at Stanford University for a discussion group of the American Academy of Arts and Sciences, Western Center.

"Problems of Creating Cognitive Maps of Scientific Research Areas," at the Center for Advanced Study in the Behavioral Sciences, Palo Alto, California.

"Studies in the Growth of Scientific Knowledge," at the University of California, Los Angeles.

### Richard Cooper

"Are Multinational Corporations Forcing Us Into National and International Economic Planning?" at the National Conference on Multinational Corporations, Washington, D.C.

\*For lists of earlier presentations, see earlier reports.

Economic Problems of Paramount Importance," a lecture for the British Broadcasting Corporation, part of a series on "The Art of Economics," commemorating the bicentennial of the publication of Adam Smith's *Wealth of Nations*.

"Economy in Disarray: World-wide Economic Interdependence," at the University of Chicago.

"Oceans as a Source of Revenue," at the Conference of the New International Economic Order in Cambridge, Massachusetts.

Other lectures presented at the World Bank in Washington, D.C.; University of California at Berkeley; Stanford University; Wayne State University; Northern California Council on World Affairs; San Francisco Committee on Foreign Relations; Bank of America and Yale Club of Palo Alto.

#### **Yehoshafat Harkabi**

"Arab-Israel Conflict, the Present Stage," at a meeting of the American Professors for Peace in the Middle East.

"Détente in the Middle East," at a Conference on Détente, Boulder, Colorado.

"Israeli's Views of Arabs," at Stanford University, Political Science Department.

Lecture on Jewish affairs at the Stanford University Faculty Luncheon, Stanford University.

"Minimum Arab Requirements for General Settlement," at a Cornell University Conference on "Israeli Options and Peace Agreements," Cornell University.

"The Situation in the Middle East," at a San Francisco Committee of Foreign Relations meeting, San Francisco, California.

"Terrorism in the Middle East," at a Conference on International Terrorism, U.S. State Department, Washington, D.C.

#### **Gerald Holton**

"Differences Between Methodologies in Physical Science and Social Science," at the Stanford luncheon group of the American Academy of Arts and Sciences, Stanford University.

"International Systems in Science," at a Conference on World Systems, American Academy of Arts and Sciences, Stanford University.

"New Pressures on the Ethos of Science," at the Stanford University Program on Values, Technology and Science, Stanford University.

"The Scientific Imagination," the Phi Beta Kappa AAAS lecture at the annual AAAS meeting, Boston, Massachusetts.

"Scientific Rationality," a debate with Theodore Roszak at San Francisco State University.

"Thematic Analysis of Scientific Theories," at: Physics Colloquium, Harvey Mudd College; History of Science Circle, University of California, Berkeley; Center for Teaching and Learning, Stanford University; Harvard Club, San Francisco, California.

**Alvin Klevorick**

Seminars at: the California Institute of Technology; National Bureau of Economic Research-West; University of British Columbia; the School of Public Policy of the University of California, Berkeley; and the University of Chicago Graduate School of Business.

"Jury Composition: An Economic Approach," part of the Distinguished Lecture Series in Law and Economics, University of San Diego School of Law.

**Gordon Meiklejohn**

"Comments on Earlier Swine Influenza Vaccines," at the Bureau of Biologies, National Institutes of Health, Bethesda, Maryland.

"Eradication of Smallpox: The Lighter Side," at the Association of Professors of Medicine, Atlantic City.

"Eradication of Smallpox: Why Did It Take So Long?" Seminar at the Development of Anthropology, University of California, Berkeley.

"Respiratory Diseases," at the Stanford Medical School, Stanford University.

"Smallpox: Is The End in Sight?" Maxwell Finland Lecture at the meeting of Infectious Disease Society of America, Washington, D.C.

"Smallpox Eradication: Is It Really True?" David Bruce Lecture at the American College of Physicians, Philadelphia, Pennsylvania.

"Swine Influenza," at the Stanford Medical School, Stanford University.

**Lincoln Moses**

"Some Thoughts About Assessing Adequacy of the Fineness of a Grid of Monitoring Stations" at the SIMS Conference, Alta, Utah.

**Joseph Pechman**

"Distribution of Tax Burdens," at the Economics Department, University of California, Los Angeles.

"Federal Tax Problems," at Lewis and Clark College, Portland, Oregon.

"Federal Tax Reform," at the Stanford Alumni Association, Stanford University.

"Financing Social Programs," at the Graduate School of Business, Stanford University.

"Inflation and the Income Tax," at the Economics Department, Stanford University.

"Issues in Federal Fiscal Policy," at the Institute of Industrial Relations, University of California, Berkeley.

"Issues in Federal Tax Reform," at the Economics Department, University of California, Berkeley.

"Methodology of Tax Burden Estimating," at the National Bureau of Economic Research.

"State-Local Financial Problems," at the Conference of State-Local Officials, Institute for Public Administration, University of California, Berkeley.

"Tax Reform" (with Bernard Wolfman), at the Center for Advanced Study in the Behavioral Sciences.

"The 1976 Tax Bill," at the Center for Advanced Study in the Behavioral Sciences.

**Bernard Wolfman**

"Emerging Issues of Federal Tax Policy," at a meeting of Town Hall of California, Los Angeles, California.

"Emerging Issues of Federal Tax Policy," at a meeting of the Chancery Club of Los Angeles, Los Angeles, California.

"The Federal Income Tax System – Process, Structure and Reform," at a meeting of the Stanford University Alumni Association, Stanford University.